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IN THE CLAIMS:

Claims 1-82 (Canceled).

83. (Currently Amended) An apparatus for converting source data to a channel-modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses (N-1) number of data channels (N is an integer larger than two) and a control channel, the apparatus comprising:

channel coding means for encoding the source data to generate (N-1) number of data part and a control part, wherein the data part is allocated to the data channel and the control part is allocated to the control channel;

code generating means for generating spreading codes to be allocated to the channels, wherein each of the spreading codes is selected on the basis of a data rate of the data part and the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on the same point or symmetrical with respect to a zero point on a phase domain; and

spreading means for spreading the control part and the data part by using the spreading code, to thereby generate the channel-modulated signal,

wherein the spreading code is an orthogonal variable spreading factor (OVSF) code and wherein said channel coding means includes spreading factor generation means for generating a spreading factor related to the data rate of the data part and wherein the spreading code allocated to the control channel is represented by $C_{256,0}$, and wherein 256 denotes the spreading factor and 0 the code number and the

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spreading codes allocated to first and second data channels
are represented by $C_{4, 1} = \{1, 1, -1, -1\}$, respectively, the
spreading codes allocated to the third and fourth data
channels are represented by $C_{4, 3} = \{1, -1, -1, 1\}$,
respectively, and the spreading codes allocated to the fifth
and sixth data channels are represented by $C_{4, 2} = \{1, -1, 1, -1\}$, respectively.

84. (Canceled)

85. (Canceled)

86. (Previously Presented) The apparatus as recited in
claim 83, wherein said code generating means includes:

control means responsive to the spreading factor, for
generating code numbers for the channels; and

spreading code generation means responsive to the spreading
factor and the code number, for generating the spreading code to
be allocated to the channels.

87. (Previously Presented) The apparatus as recited in
claim 86, wherein said spreading code generation means includes:

counting means for consecutively producing a count value
in synchronization with a clock signal;

first spreading code generation means responsive to the
count value and the spreading factor for generating the
spreading code to be allocated to the data channel; and

second spreading code generation means responsive to the
count value and the spreading factor for generating the
spreading code to be allocated to the control channel.

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88. (Previously Presented) The apparatus as recited in claim 87, wherein the first spreading code generation. means includes:

first logical operation means responsive to the count value for carrying out a logical operation with the spreading factor and the code number related to the data part, to thereby generate the spreading code related to the data part; and

first selection means for outputting the spreading code related to the data part in response to a select signal as the spreading factor related to the data part.

89. (Previously Presented) The apparatus as recited in claim 87, wherein the second spreading code generation means includes:

second logical operation means responsive to the count value for carrying out a logical operation with the spreading factor and the code number related to the control part, to thereby generate the spreading code related to the control part; and

second selection means for outputting the spreading code related to the control part in response to a select signal as the spreading factor related to the control part.

90. (Previously Presented) The apparatus as recited in claim 89, wherein said second logical operation means receives a code number of $I_7I_6I_5I_4I_3I_2I_1I_0$, a count value of $B_7B_6B_5B_4B_3B_2B_1B_0$ and a predetermined spreading factor.

91. (Previously Presented) The apparatus as recited in claim 90, wherein the second logical operation means carries out

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a logical operation of $\prod_{i=0}^{N-2} {}^{\oplus}I_i \bullet B_{N-1-i}$ if the predetermined

spreading factor is 2^N where N is 2 to 8.

92. (Previously Presented) The apparatus as recited in
claim 88, wherein said first logical operation means receives a
code number of $I_7I_6I_5I_4I_3I_2I_1I_0$, a count value of $B_7B_6B_5B_4B_3B_2B_1B_0$
and a predetermined spreading factor.

93. (Previously Presented) The apparatus as recited in
claim 92, wherein the first logical operation means carries out

a logical operation of $\prod_{i=0}^{N-2} {}^{\oplus}I_i \bullet B_{N-1-i}$ if the predetermined

spreading factor is 2^N where N is 2 to 8.

94. (Previously Presented) The apparatus as recited in
claim 87, wherein said counting means includes an 8-bit counter
when the 2^N is a maximum spreading factor.

95. (Canceled)

96. (Currently Amended) The apparatus as recited in claim
~~89~~ 88, wherein said first ~~and second~~ logical operation means
~~include~~ includes a plurality of AND gates and a plurality of
exclusive OR gates, respectively.

97. (Currently Amended) The apparatus as recited in claim
~~89~~ 88, wherein said first ~~and second~~ selection means ~~include~~
includes a multiplexer, respectively.

98. (Canceled)

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99. (Previously Presented) The apparatus as recited in claim 83, wherein said mobile station includes two, three, four, five or six data channels.

100. (Canceled)

101. (Previously Presented) The apparatus as recited in claim 83, wherein the spreading factor related to the data part is 2^N where $N = 2$ to 8 and wherein the code number related to the data part is $2^N/4$ and wherein the data part is allocated to the data channel.

102. (Previously Presented) The apparatus as recited in claim 83, wherein said code generating means further includes;
signature generation means for generating a predetermined signature; and
scrambling code generation means for generating a scrambling code.

103. (Previously Presented) The apparatus as recited in claim 102, wherein the code numbers related to the data part and the control part are dependent on the predetermined signature, if the scrambling code is shared by multiple mobile stations and wherein the data part and the control part are allocated to the data channel and the control channel, respectively.

104. (Previously Presented) The apparatus as recited in claim 103, wherein the spreading factor related to the control part is 256 and wherein the code number related to the control part is $16(S-1)+15$ where $S = 1$ to 16 and S is the predetermined signature.

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105. (Previously Presented) The apparatus as recited in claim 104, wherein the spreading factor related to the data part is 2^N where $N = 5$ to 8 and wherein the code number related to the data part is $2^N(S-1)/16$.

106. (Previously Presented) The apparatus as recited in claim 83, further comprising:

scrambling means for scrambling the data and control parts and a scrambling code, to thereby rotate the two points and generate scrambled signals.

107. (Previously Presented) The apparatus as recited in claim 106, further comprising:

filtering means for pulse-shaping the scrambled signals and generating pulse-shaped signals; and

gain adjusting means for adjusting gain of each of the pulse-shaped signals.

108. (Previously Presented) The apparatus as recited in claim 106, wherein one of the two points is rotated to clockwise direction and the other is rotated to counterclockwise direction by a phase of 45°, respectively.

109. (Previously Presented) The apparatus as recited in claim 108, wherein a phase difference between the rotated points is 90°.

110. (Canceled)

111. (Canceled)

112. (Canceled)

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113. (Currently Amended) A mobile station for converting source data to a channel-modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data, wherein the mobile station uses (N-1) number of data channels (N is an integer equal to larger than two) and a control channel, the mobile station comprising:

channel coding means for encoding the source data to generate (N-1) number of data parts and a control part, wherein the data part is allocated to the data channel and the control part is allocated to the control channel;

code generating means for generating N number of spreading codes to be allocated to the channels, wherein each of the spreading codes is selected on the basis of a data rate of each data part and the control part and the spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on the same point or symmetrical with respect to a zero point on a phase domain; and

spreading means for spreading the control part and the data parts by using the spreading codes, to thereby generate the channel-modulated signal,

wherein the spreading code is an orthogonal variable spreading factor (OVSF) code and wherein said channel coding means includes spreading factor generation means for generating a spreading factor related to the data rate of the data part, and

wherein the spreading code allocated to the control channel is represented by $C_{256.0}$, and wherein 256 denotes the spreading factor and 0 the code number,

wherein in case said mobile station includes one data channel, the spreading factor related to the data part is 2^N

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~~where N = 2 to 8 and wherein the code number related to the data part is 2^N/4~~

and wherein in case said mobile station includes at least two data channels, the spreading codes allocated to first and second data channels are represented by $C_{4, 1} = \{1, 1, -1, -1\}$, respectively, the spreading codes allocated to the third and fourth data channels are represented by $C_{4, 3} = \{1, -1, -1, 1\}$, respectively, and the spreading codes allocated to the fifth and sixth data channels are represented by $C_{4, 2} = \{1, -1, 1, -1\}$, respectively.

114. (Canceled)

115. (Canceled)

116. (Previously Presented) The mobile station as recited in claim 115, further comprising:

frequency converting means coupled to said spreading means for converting the channel-modulated signal to a radio frequency signal; and

antenna for sending the radio frequency signal to a base station.

117. (Currently Amended) A method for converting source data to a channel- modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses (N-1) number of data channels (N is an integer larger than two) and a control channel, the method comprising the steps of:

a)   encoding the source data to generate (N-1) number of data part and a control part, wherein the data part is

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allocated to the data channel and the control part is allocated to the control channel;

b) generating spreading codes to be allocated to the channels, wherein each of the spreading codes is selected on the basis of a data rate of the data part and the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on the same point or symmetrical with respect to a zero point on a phase domain; and

c) spreading the control part and the data part by using the spreading code, to thereby generate the channel-modulated signal,

wherein the spreading code is an orthogonal variable spreading factor (OVSF) code and the spreading code allocated to the control channel is represented by $C_{256,0}$, and wherein 256 denotes spreading factor and 0 code number and the spreading codes allocated to first and second data channels are represented by $C_{4,1} = \{1, 1, -1, -1\}$, respectively, the spreading codes allocated to the third and fourth data channels are represented by $C_{4,3} = \{1, -1, -1, 1\}$, respectively, and the spreading codes allocated to the fifth and sixth data channels are represented by $C_{4,2} = \{1, -1, 1, -1\}$, respectively.

118. (Canceled)

119. (Previously Presented) The method as recited in claim 117, wherein said step a) includes the steps of:

a1) encoding the source data to generate the data part and the control part; and

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a2) generating a spreading factor related to the data
rate of the data part.

120. (Previously Presented) The method as recited in
claim 119, wherein said step b) includes the steps of:

b1) generating code numbers for the channels in response
to the spreading factor; and

b2) generating the spreading code to be allocated to the
channels in response to the spreading factor and the code
number.

121. (Previously Presented) The method as recited in
claim 120, wherein said mobile station includes a data channel
and a control channel for PRACH application.

122. (Previously Presented) The method as recited in claim
120, wherein said step b2) includes the steps of:

b2-a) producing a count value in synchronization with a
clock signal; and

b2-b) carrying out a logical operation with the spreading
factor and the code number related to the data part and the
control part in response to the count value, to thereby generate
the spreading code related to the data part.

123. (Previously Presented) The method as recited in claim
122, wherein the code number and the count value are represented
by an 8-bit signal of $I_7I_6I_5I_4I_3I_2I_1I_0$ and an 8-bit signal of
$B_7B_6B_5B_4B_3B_2B_1B_0$, respectively.

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124. (Previously Presented) The method as recited in claim
123, wherein the logical operation is accomplished by
$\prod_{i=0}^{N-2} {}^{\oplus}I_i \cdot B_{N-1-i}$ if the spreading factor is 2^N where N is 2 to 8.

125. (Canceled)

126. (Currently Amended) The method as recited in claim
117, wherein the mobile station includes two, three, four, five
or six data channels.

127. (Canceled)

128. (Previously Presented) The method as recited in claim
120, wherein the spreading factor related to the data part is 2^N
where N = 2 to 8 and wherein the code number related to the data
part is $2^N/4$.

129. (Previously Presented) The method as recited in claim
121, wherein said step b) further includes the steps of:
   b3) generating a predetermined signature; and
   b4) generating a scrambling code.

130. (Previously Presented) The method as recited in claim
129, wherein the code numbers related to the data part and the
control part are dependent on the predetermined signature, if
the scrambling code is shared by multiple mobile stations and
wherein the data part and the control part are allocated to the
data channel and the control channel, respectively.

131. (Previously Presented) The method as recited in claim
130, wherein the spreading factor related to the control part is

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256 and wherein the code number related to the control part is
16(S-1)+15 where S = 1 to 16 and S is the predetermined
signature.

132. (Previously Presented) The method as recited in claim
131, wherein the SF related to the data part is 2^N where N = 5
to 8 and wherein the code number related to the data part is
$2^N(S-1)/16$.

133. (Previously Presented) The method as recited in claim
117, further comprising the step of:
   d) scrambling the data and control parts and a scrambling
code, to thereby rotate the two points and generate scrambled
signals.

134. (Previously Presented) The method as recited in claim
133, further comprising the step of:
   e) filtering the scrambled signals and generating pulse-
shaped signals; and
   f) adjusting gain of the pulse-shaped signals.

135. (Previously Presented) The method as recited in claim
117, wherein one of the two points is rotated to clockwise
direction and the other is rotated to counterclockwise direction
by a phase of 45°, respectively.

136. (Previously Presented) The method as recited in claim
135, wherein a phase difference between the rotated points is
90°.

137. (Canceled)

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138. (Canceled)

139. (Canceled)

140. (Currently Amended) The apparatus as recited in claim ~~85~~ 120, wherein said mobile station includes a data channel and a control channel for PRACH application.

141. (Currently Amended) A method for converting source data to a channel- modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses (N-1) number of data channels (N is an integer larger than two) and a control channel, the method comprising the steps of:

a) encoding the source data to generate (N-1) number of data part and a control part, wherein the data part is allocated to the data channel and the control part is allocated to the control channel;

b) generating spreading codes to be allocated to the channels, wherein each of the spreading codes is selected on the basis of a data rate of the data part and the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on the same point or symmetrical with respect to a zero point on a phase domain; and

c) spreading the control part and the data part by using the spreading code, to thereby generate the channel-modulated signal,

wherein the spreading code is an orthogonal variable spreading factor (OVSF) code and the spreading code allocated to

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the control channel ~~is~~ represented by $C_{256,0}$, <u>and wherein</u> 256
~~denoting~~ <u>denotes</u> the spreading factor and 0 the code number,

wherein <u>in</u> case said mobile station includes one data
channel, the spreading factor related to the data part is 2^N
where N = 2 to 8 and wherein the code number related to the data
part is $2^N/4$

and wherein <u>in</u> case said mobile station includes at least
two data channels, the spreading codes allocated to first and
second data channels are represented by $C_{4,1} = \{1, 1, -1, -1\}$,
respectively, <u>the spreading codes allocated to the third and</u>
<u>fourth data channels are represented by $C_{4,3} = \{1, -1, -1, 1\}$,</u>
<u>respectively, and the spreading codes allocated to the fifth and</u>
<u>sixth data channels are represented by $C_{4,2} = \{1, -1, 1, -1\}$,</u>
<u>respectively</u>.

142-151. (Canceled).

152. (New) An apparatus for converting source data to a
channel-modulated signal having a plurality of pairs of in-
phase (I) and quadrature-phase (Q) data in a mobile station,
wherein the mobile station uses (N-1) number of data channels
(N is an integer larger than two) and a control channel, the
apparatus comprising:

channel coding means for encoding the source data to
generate (N-1) number of data part and a control part, wherein
the data part is allocated to the data channel and the control
part is allocated to the control channel;

code generating means for generating spreading codes to be
allocated to the channels, wherein each of the spreading codes
is selected on the basis of a data rate of the data part and

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the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on the same point or symmetrical with respect to a zero point on a phase domain; and

spreading means for spreading the control part and the data part by using the spreading code, to thereby generate the channel-modulated signal,

wherein the spreading code is an orthogonal variable spreading factor (OVSF) code and wherein said channel coding means includes spreading factor generation means for generating a spreading factor related to the data rate of the data part and wherein the spreading code allocated to the control channel is represented by $C_{256,0}$, and wherein 256 denotes the spreading factor and 0 the code number and the spreading codes allocated to first and second data channels are represented by $C_{4,1} = \{1, 1, -1, -1\}$, respectively;

said code generating means including control means responsive to the spreading factor for generating code numbers for the channels, and spreading code generation means responsive to the spreading factor and the code number for generating the spreading code to be allocated to the channels, said spreading code generation means including, counting means for consecutively producing a count value in synchronization with a clock signal, first spreading code generation means responsive to the count value and the spreading factor for generating the spreading code to be allocated to the data channel, and second spreading code generation means responsive to the count value and the spreading factor for generating the spreading code to be allocated to the control channel.

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153. (New) The apparatus as recited in claim 152, wherein the first spreading code generation means includes:

first logical operation means responsive to the count value for carrying out a logical operation with the spreading factor and the code number related to the data part, to thereby generate the spreading code related to the data part; and

first selection means for outputting the spreading code related to the data part in response to a select signal as the spreading factor related to the data part.

154. (New) The apparatus as recited in claim 152, wherein the second spreading code generation means includes:

second logical operation means responsive to the count value for carrying out a logical operation with the spreading factor and the code number related to the control part, to thereby generate the spreading code related to the control part; and

second selection means for outputting the spreading code related to the control part in response to a select signal as the spreading factor related to the control part.

155. (New) The apparatus as recited in claim 154, wherein said second logical operation means receives a code number of $I_7 I_6 I_5 I_4 I_3 I_2 I_1 I_0$, a count value of $B_7 B_6 B_5 B_4 B_3 B_2 B_1 B_0$ and a predetermined spreading factor.

156. (New) The apparatus as recited in claim 155, wherein the second logical operation means carries out a logical operation of $\prod_{i=0}^{N-2} {}^{\oplus} I_i \bullet B_{N-1-i}$ if the predetermined spreading factor is 2^N where N is 2 to 8.

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157. (New) The apparatus as recited in claim 153, wherein said first logical operation means receives a code number of $I_7I_6I_5I_4I_3I_2I_1I_0$, a count value of $B_7B_6B_5B_4B_3B_2B_1B_0$ and a predetermined spreading factor.

158. (New) The apparatus as recited in claim 157, wherein the first logical operation means carries out a logical operation of $\prod_{i=0}^{N-2} {}^{\oplus}I_i \bullet B_{N-1-i}$ if the predetermined spreading factor is 2^N where N is 2 to 8.

159. (New) An apparatus for converting source data to a channel-modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses (N-1) number of data channels (N is an integer larger than two) and a control channel, the apparatus comprising:

channel coding means for encoding the source data to generate (N-1) number of data part and a control part, wherein the data part is allocated to the data channel and the control part is allocated to the control channel;

code generating means for generating spreading codes to be allocated to the channels, wherein each of the spreading codes is selected on the basis of a data rate of the data part and the control part and spreading codes are selected so that two consecutive pairs of the I and Q data are correspondent to two points located on the same point or symmetrical with respect to a zero point on a phase domain; and

spreading means for spreading the control part and the data part by using the spreading code, to thereby generate the channel-modulated signal,

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wherein the spreading code is an orthogonal variable spreading factor (OVSF) code and wherein said channel coding means includes spreading factor generation means for generating a spreading factor related to the data rate of the data part and wherein the spreading code allocated to the control channel is represented by $C_{256,0}$, and wherein 256 denotes the spreading factor and 0 the code number and the spreading codes allocated to first and second data channels are represented by $C_{4,1} = \{1, 1, -1, -1\}$, respectively;

said code generating means further including signature generation means for generating a predetermined signature, and scrambling code generation means for generating a scrambling code, wherein said code numbers related to the data part and the control part are dependent on the predetermined signature, if the scrambling code is shared by multiple mobile stations and wherein the data part and the control part are allocated to the data channel and the control channel, respectively, and wherein the spreading factor related to the control part is 256 and wherein the code number related to the control part is $16(S-1)+15$ where $S = 1$ to 16 and S is the predetermined signature.

160. (New) The apparatus as recited in claim 159, wherein the spreading factor related to the data part is 2^N where $N = 5$ to 8 and wherein the code number related to the data part is $2^N(S-1)/16$.

161. (New) A method for converting source data to a channel- modulated signal having a plurality of pairs of in-phase (I) and quadrature-phase (Q) data in a mobile station, wherein the mobile station uses (N-1) number of data channels

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(N is an integer larger than two) and a control channel, the
method comprising the steps of:

    b)   encoding the source data to generate (N-1) number of
data part and a control part, wherein the data part is
allocated to the data channel and the control part is
allocated to the control channel;

    b) generating spreading codes to be allocated to the
channels, wherein each of the spreading codes is selected on
the basis of a data rate of the data part and the control part
and spreading codes are selected so that two consecutive pairs
of the I and Q data are correspondent to two points located on
the same point or symmetrical with respect to a zero point on
a phase domain; and

    c) spreading the control part and the data part by using
the spreading code, to thereby generate the channel-modulated
signal,

    wherein the spreading code is an orthogonal variable
spreading factor (OVSF) code and the spreading code allocated
to the control channel is represented by $C_{256,0}$, and wherein
256 denotes spreading factor and 0 code number and the
spreading codes allocated to first and second data channels
are represented by $C_{4,1} = \{1, 1, -1, -1\}$, respectively;

    said step a) including,

    a1) encoding the source data to generate the data part
and the control part; and

    a2) generating a spreading factor related to the data

    said step b) including,

    b1) generating code numbers for the channels in response
to the spreading factor; and

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b2) generating the spreading code to be allocated to the
channels in response to the spreading factor and the code
number, said step b2) further including,

b2-a) producing a count value in synchronization
with a clock signal; and

b2-b) carrying out a logical operation with the
spreading factor and the code number related to the data
part and the control part in response to the count value,
to thereby generate the spreading code related to the data
part.

162. (New) The method as recited in claim 161, wherein the
code number and the count value are represented by an 8-bit
signal of $I_7I_6I_5I_4I_3I_2I_1I_0$ and an 8-bit signal of $B_7B_6B_5B_4B_3B_2B_1B_0$,
respectively.

163. (New) The method as recited in claim 162, wherein the
logical operation is accomplished by $\prod_{i=0}^{N-2} {}^{\oplus}I_i \bullet B_{N-1-i}$ if the
spreading factor is 2^N where N is 2 to 8.

164. (New) A method for converting source data to a
channel- modulated signal having a plurality of pairs of in-
phase (I) and quadrature-phase (Q) data in a mobile station,
wherein the mobile station uses (N-1) number of data channels
(N is an integer larger than two) and a control channel, the
method comprising the steps of:

c) encoding the source data to generate (N-1) number of
data part and a control part, wherein the data part is

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allocated to the data channel and the control part is
allocated to the control channel;

b) generating spreading codes to be allocated to the
channels, wherein each of the spreading codes is selected on
the basis of a data rate of the data part and the control part
and spreading codes are selected so that two consecutive pairs
of the I and Q data are correspondent to two points located on
the same point or symmetrical with respect to a zero point on
a phase domain; and

c) spreading the control part and the data part by using
the spreading code, to thereby generate the channel-modulated
signal,

wherein the spreading code is an orthogonal variable
spreading factor (OVSF) code and the spreading code allocated
to the control channel is represented by $C_{256,0}$, and wherein
256 denotes spreading factor and 0 code number and the
spreading codes allocated to first and second data channels
are represented by $C_{4,1} = \{1, 1, -1, -1\}$, respectively;

said step a) including,

a1) encoding the source data to generate the data
part and the control part; and

a2) generating a spreading factor related to the
data rate of the data part;

said step b) including,

b1) generating code numbers for the channels in
response to the spreading factor; and

b2) generating the spreading code to be allocated to
the channels in response to the spreading factor and the
code number;

said step b) further including,

b3) generating a predetermined signature; and

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b4) generating a scrambling code;

wherein the code numbers related to the data part and the control part are dependent on the predetermined signature, if the scrambling code is shared by multiple mobile stations and wherein the data part and the control part are allocated to the data channel and the control channel, respectively; and

wherein the spreading factor related to the control part is 256 and wherein the code number related to the control part is $16(S-1)+15$ where $S = 1$ to 16 and S is the predetermined signature.

165. (New) The method as recited in claim 164, wherein the SF related to the data part is 2^N where $N = 5$ to 8 and wherein the code number related to the data part is $2^N(S-1)/16$.